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JOURNAL OF

THE NEW ENGLAND BOTANICAL CLUB

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NOTES ON NEW ENGLAND HEPATICAE, — II.

ALEXANDER W. EVANS.

(Plate 57.)

IN the first paper of this series¹ attention was called to fourteen species of Hepaticae which were of interest either because they were new to New England or because they were imperfectly described in American literature. The present paper is a continuation along the same lines. With the exception of *Scapania convexula* and the new *Lepidozia* all of the species noted are common to Europe. The arrangement followed is again that of Schiffner in Engler and Prantl's "Die Natürlichen Pflanzenfamilien."

1. PALLAVICINIA FLOTOWIANA (Nees) Lindb. Musc. Scand. 10. 1879. *Cordaea Flotowiana* Nees, Flora, 16: 405. 1833. *Diplolaena Lyellii*, var. *Flotowiana* Nees, Naturgeschichte der europ. Lebermoose, 3: 344. 1838. *Blyttia Lyellii*, var. *Flotowiana* G. L. & N. Syn. Hep. 475. 1846. *Moerckia hibernica*, var. *Wilsoniana* Gottsche; Rabenhorst, Hep. Europ. 121 (note). 1860. *Pallavicinia hibernica*, vars. *Wilsoniana* and *leptodesma* Pears. Hep. Brit. Isles, 435, 436. pl. 193. 1901. *Moerckia Flotowiana* Schiffn. Oesterr. Bot. Zeitschr. 51: 41. 1901. A very few plants of this interesting species were found last September by A. LeRoy Andrews on Mt. Greylock, Massachusetts; they were growing on a wet bank in the "Notch."² Until recently most botanists have considered the species a variety or even a mere form of *P. hibernica*, and no allusion to it what-

¹ RHODORA, 4: 207-213. 1902.

² Mr. Andrews has already noted his discovery in RHODORA, 6: 75. 1904.

ever is made by Stephani in his *Species Hepaticarum* (1900). The studies of Warnstorf,¹ however, show conclusively that the plant is worthy of specific rank, and it is now recognized as a distinct species by Schiffner and by several other European hepaticologists. Many years ago Nees von Esenbeck² referred to *P. Flotowiana* a specimen from Newfoundland, in the Montagne herbarium. This is apparently the only reference to the species as an American plant, and even this must be considered doubtful since the Newfoundland specimen is not mentioned in any subsequent writings. The species, however, was collected several years ago at Yakutat, Alaska, by Coville and Kearney and has been listed and described by the writer under the name of *P. hibernica*.³ The latter species has also been recorded from Nebraska, Ontario and British Columbia,⁴ and it is of course possible that some of these reports are based on *P. Flotowiana* instead of on the true *P. hibernica*. The two species are separated from each other by purely vegetative characters: *P. hibernica* is less robust than *P. Flotowiana*, the midrib of the thallus is thinner and passes more abruptly into the delicate marginal wing, and the latter is never crispate but is plane or nearly so. In robust forms of *P. Flotowiana*, Tansley and Chick⁵ have demonstrated the presence in the midrib of two slender strands of slightly elongated cells with lignified walls, and Pearson's var. *leptodesma* is based on a peculiarity of this sort. Cavers⁶ has shown that these strands play an important part in the conduction of water, just as the single strand does in *P. Lyellii*, but he has also shown that they fail to develop in plants cultivated under very moist conditions. It would appear from this that the presence or absence of the strands is not of very great importance from the standpoint of the taxonomist and that it should hardly be used as a differential character in separating *Moerckia* generically from *Pallavicinia*. *P. Flotowiana* is perhaps the most noteworthy of the recent additions to the hepatic flora of New England.

¹ Allgem. Bot. Zeitschr. 1899: 15. Kryptogamenfl. der Mark Brandenburg, 1: 99. 1902.

² Naturgeschichte der europ. Lebermoose, 3: 346. 1838.

³ Proc. Wash. Acad. 2: 291. 1900.

⁴ Webber, Cat. Flora Nebraska, 93. 1890; Macoun, Cat. Canadian Plants, 7: 8. 1902.

⁵ Ann. Bot. 15: 7. pl. 1, f. 1. 1901.

⁶ The Naturalist, 1903: 451.

2. *MARSUPELLA AQUATICA* (Nees) Schiffn. Lotos, 44: 267. 1896. *J. emarginata*, var. *aquatica* Lindenb. Nova Acta Acad. Caes. Leop.-Carol. 14, suppl.: 75. 1829 (not *Jungermannia aquatica* Schrank, 1789).¹ *Sarcoscyphus Ehrharti*, var. *aquaticus* Nees, Naturgeschichte der europ. Lebermoose, 1: 125. 1833. *J. emarginata*, var. *grandis* Hüben. Hep. Germ. 124. 1834. *S. Ehrharti*, var. *robustus* DeNot. Comm. Soc. Critt. Ital. 1: 80. f. 4. 1861. *Nardia emarginata*, vars. *major* and *aquatica* Carr. Brit. Hep. 14. 1874. *M. emarginata*, var. *aquatica* Dumort. Hep. Eur. 126. 1874. *N. robusta* Trevis. Mem. R. Ist. Lomb. III. 4: 400. 1877. *N. emarginata*, var. *aquatica* Massal. & Carest. Nuovo Gior. Bot. Ital. 12: 312. 1880. *S. aquaticus* Breidl. Mitth. d. Naturw. Ver. f. Steiermark, 30: 286. 1894. Mt. Katahdin, Maine (*Cowles Party*); White Mountains, New Hampshire (*Oakes*).

3. *MARSUPELLA MEDIA* (Gottsche) Schiffn. Lotos, 49: 49. 1901 (as synonym). *Sarcoscyphus sphacelatus*, var. *medius* Gottsche; Rabenhorst, Hep. Europ. 137. 1860 (in part). *S. Sullivanti* DeNot. Comm. Soc. Critt. Ital. 1: 84. f. 6. 1861.² *S. Ehrharti*, var. *erythrorhizus* Limpr.; Cohn, Kryptogamenfl. von Schlesien, 1: 248. 1876. *S. sphacelatus*, var. *erythrorhizus* Limpr. l. c. 432. *Nardia sphacelata*, var. *media* Massal. Ann. dell. Ist. Bot. di Roma, 2: (9). 1886. *M. sphacelata*, var. *erythrorhiza* Schiffn. Lotos, 44: 267. 1896. *M. erythrorhiza* Schiffn. l. c. 49: 48. 1901. Streaked Mountain, Hebron, Maine (*J. A. Allen*); Mt. Washington, New Hampshire (*L. M. Underwood*); Magnolia, Massachusetts (*W. G. Farlow*); Mt. Carmel and Beacon Falls, Connecticut (*A. W. E.*).

Only two dioicous species of *Marsupella*, *M. emarginata* and *M. sphacelata*, have been recognized by American students as occurring in eastern North America. These two species, which have a wide distribution in northern regions, have recently been studied by Professor Schiffner, of Vienna, one of the most careful students of the Hepaticae, and the conclusion is reached that both species, as ordinarily understood, are aggregates. What he considers the typical *M. emarginata* grows in moist rather than wet localities and is some-

¹ The synonym "*Jungermannia aquatica*" for this species is sometimes attributed to Schrader, with the citation "Spic. Fl. Germ. 75. 1794." This, however, is an error, because Schrader, although describing the plant in the place quoted, does not give it a formal name.

² Based on Musc. Alleg. 216 (distributed as *Sarcoscyphus Ehrharti*.)

times completely dried up in the summer; from this he would separate as a distinct species the submerged *M. aquatica*. The typical *M. sphacelata*, on the other hand, is a submerged aquatic, and from this he would separate *M. erythrorhiza*, which grows in drier localities. *M. aquatica* and *M. erythrorhiza* were both clearly described many years ago by Limpricht, who treated them as varieties only, but implied at the same time that their characters were fully as marked as those separating the typical forms of *M. emarginata* and *M. sphacelata*. The validity of *M. aquatica* as a species was recognized by Lindberg, Massalongo, Stephani and others, and there is now a tendency among European writers to recognize *M. erythrorhiza* also. The choice of a name for this second species is not an easy matter. The oldest synonym is the one first quoted, but Schiffer discards the name *media*, provisionally at least, because No. 137 of the Hep. Europ. is a mixture of two species. If we follow him in this course we should choose the name *Sullivanti* of DeNotaris rather than the later name *erythrorhiza* of Limpricht. The synonymy of the species is already very complicated and in order to avoid increasing it still further the name *M. media* is here retained.

The characters separating *M. aquatica* and *M. media* from the two species to which they are respectively allied are drawn almost entirely from the vegetative organs; they concern the structure of the stem, the shape of the leaves and the peculiarities of the leaf-cells. Most of these characters are relative, and although extreme forms of both species are easily distinguished, other forms are sometimes met with which are difficult to refer definitely. As, however, other species, such as *Lophozia lycopodioides* and *L. Floerkii*, are recognized, between which connecting links actually occur, there seems to be no great objection to following this policy in the case of *M. aquatica* and *M. media*. Even if they are not yet wholly permanent, they are assuredly species in the process of evolution.

M. aquatica is a very robust plant and sometimes reaches a length of a decimeter or more. The stems are sparingly branched and very firm in consistency. In a cross-section the cells all appear of about the same size and are polygonal in outline. Those in the middle are thin-walled but pass gradually into the thick-walled cells of the outer portion. The outermost layer is composed of shorter cells than those in the interior but they are usually thick-walled also; sometimes, however, close to the base of a leaf, the walls of this

layer are distinctly thinner. The stiff leaves spread widely from the stem, so that even when close together they do not present the appearance of being crowded. They are strongly complicate and are bifid about one-eighth with a short and blunt apical sinus and broad and rounded lobes. The leaf-cells are usually distinctly thickened throughout and have conspicuous trigones. The true *M. emarginata* is a smaller plant with shorter and more delicate stems, although the latter are essentially the same in structure. The leaves, which spread more obliquely from the stem, are more obtusely complicate and more deeply lobed, the lobes being sometimes blunt but usually obtusely pointed. The walls of the leaf-cells are less strongly thickened although still provided with conspicuous trigones. With respect to color *M. emarginata* varies from bright green to reddish. *M. aquatica* also varies considerably but is usually of a duller hue; sometimes it glistens as if varnished. Neither species ever exhibits the deep purplish black color which is so often to be seen in *M. media*. *M. aquatica* is apparently confined to alpine or subalpine regions while *M. emarginata* descends into the plains.

M. sphacelata attains its most characteristic development in the boggy pools and sluggish brooks of subalpine regions. The following are the only New England stations to be cited at present with certainty: Mt. Washington, New Hampshire (*D. C. Eaton, W. G. Farlow, A. W. E.*); Mt. Mansfield, Vermont (*D. C. Eaton, A. W. E.*). The records for Maine and Connecticut, therefore, in the writer's Preliminary List of New England Hepaticae¹ should be revised. The species grows in broad thick tufts of a dull green color often tinged with blackish and is much less firm in consistency than the two plants just considered. In cross-section the stem shows a distinct border of large thin-walled cells; just within this the cells have slightly thickened walls but pass gradually into the thin-walled cells of the interior. The leaves are divided by a narrow sinus into two broad and rounded lobes; they are very delicate in texture, and yet their cells, although thin-walled, show small but distinct trigones. *M. media* is found not only in the mountains but also in the plains, and its range extends as far south as Georgia. It is a much firmer plant than *M. sphacelata* and is usually much more richly colored; a deep purplish black is perhaps the most character-

¹ RHODORA, 5: 170-173. 1903.

istic hue, but in shaded localities the color tends to be much paler. The cross-section of the stem, as in *M. sphacelata*, shows a distinct border of thin-walled cells, but this is often broken down and indefinite in weathered specimens; the cells just within this layer are very thick-walled but grade into the thin-walled cells of the interior. The leaves are more deeply divided than in *M. sphacelata*, and their divisions, although commonly rounded, are sometimes obtusely pointed; the leaf-cells have slightly thickened walls and distinct trigones but are more delicate than in *M. emarginata*. The reddish rhizoids, which account for Limpricht's varietal name, may usually be detected on the stems and branches themselves, especially near the base, as well as on the stolons. They are not confined to *M. media* but may also be found in *M. emarginata* and *M. sphacelata*, where, however, they are scanty and developed only on the stolons. Even in *M. media* these rhizoids are sometimes very few in number and bleached out until they are almost colorless, so that they do not always constitute a reliable character.

4. JUNGERMANNIA CORDIFOLIA Hook. Brit. Jung. *pl.* 32. 1816. *Aplozia cordifolia* Dumort. Hep. Eur. 61. 1874. *Solenostoma cordifolium* Steph. Bull. de l'Herb. Boissier, II. 1: 499. 1901. Many years ago Russell¹ doubtfully referred to *J. cordifolia* a sterile hepatic which he had collected in bogs at Plymouth, Massachusetts. He described his specimens as being "furnished with capitula and with white pulverulent granules," so that he evidently had a gemmiparous plant before him. His determination, therefore, was probably incorrect as the gemmae of *J. cordifolia* are unknown. A second New England record, from Oakes Gulf in the White Mountains,² has also been proved erroneous, the specimens in question being referable to *Nardia obovata*.³ The true *J. cordifolia*, however, was discovered by Miss Annie Lorenz and the writer at Rainbow, Connecticut, during the June meeting of the Connecticut Botanical Society in 1903; it may therefore be looked upon as an addition to the New England flora and also to that of the eastern United States. The species is already known from Cape Breton and from other parts of Canada and is abundant from the Rocky Mountains westward. The Rainbow specimens grew on wet and gently sloping rocks on the banks

¹ Boston Jour. Nat. Hist. 3: 466. 1845.

² Hep. Amer. 113.

³ Evans, Proc. Wash. Acad. 2: 298. 1900.

of the Farmington River, and the majority of them were partially covered with sand. It is probably on this account that they are less robust than is usual in the species and that their leaves are less concave and more frequently spreading. In these respects the specimens resemble large forms of *J. riparia* Tayl. (particularly the var. *potamophila* Bernet¹) a species known in America from British Columbia only. In *J. cordifolia*, however, the walls of the leaf-cells although thin are firm and usually more or less pigmented with purplish red, while in *J. riparia* the cell-structure is more delicate and the walls are colorless. The cells of *J. cordifolia*, moreover, are wholly destitute of trigones, while in *J. riparia* minute but distinct trigones may almost always be demonstrated. The cuticle of *J. cordifolia*, finally, is distinctly striate-verruculose, especially toward the bases of the leaves, while in the other species it is perfectly smooth. According to Pearson² the absence of rootlets and of flagella is a constant peculiarity of *J. cordifolia*, both being abundantly produced by *J. riparia*. This difference cannot be relied upon; the fertile specimens of *J. cordifolia* distributed by Schiffner in his Hep. Europ. Exsic. 78, show both rootlets and flagella, and the same is true of the Rainbow specimens.

5. SPHENOLOBUS EXSECTAEFORMIS (Breidl.) Steph. Bull. de l'Herb. Boissier, II. 2: 178. 1902. *Jungermannia exsectaeformis* Breidl. Mitth. d. Naturw. Ver. f. Steiermark, 30: 321. 1894. *Diplophyllum exsectiforme* Warnst. Kryptogamenfl. der Mark Brandenburg, 1: 161. 1902. Mt. Desert, Maine (*W. G. Farlow*); Randolph, New Hampshire (*W. G. Farlow*); Laconia, New Hampshire (*Mrs. Carter*); Jericho, Vermont (*A. W. E.*).

6. SPHENOLOBUS EXSECTUS (Schmid.) Steph. Bull. de l'Herb. Boissier, II. 2: 178. 1902. *Jungermannia exsecta* Schmid. Ic. Plant. Ed. II. 241. pl. 62, f. 2, p. p. 1797. *Lophozia exsecta* Dumort. Recueil d'Obs. sur les Jung. 17. 1835. *Scapania exsecta* Aust. Hep. Bor.-Amer. 21. 1873. *Diplophyllum exsectum* Warnst. Kryptogamenfl. der Mark Brandenburg, 1: 160. 1902. Shelburne and Glen Ellis, New Hampshire (*W. G. Farlow*); Willoughby, Vermont (*Miss Lorenz*); Branford, Connecticut (*A. W. E.*).

The two species just noted are very closely allied, and it is only

¹ Cat. des Hép. du Sud-Ouest de la Suisse, etc. 58. pl. 1, f. 1. 1888.

² Hep. Brit. Isles, 291. 1901.

within recent years that they have been clearly distinguished. Both species produce an abundance of gemmae but are exceedingly rare in fruit. The characters which separate them are derived from the leaf-cells and the gemmae. In *S. exsectaeformis* the median cells average $22 \times 36 \mu$, and their thin walls show distinct trigones; in *S. exsectus* the cells in the same position average $9 \times 18 \mu$, and their walls are more uniformly thickened, the trigones being inconspicuous. The gemmae of *S. exsectaeformis* are angular, while those of the other species are ellipsoidal or ovoid. Both species are widely distributed in Europe, and an interesting account of them may be found in a recent paper by M. G. Dismier, of Saint-Maur, France.¹ Under his *Scapania exsecta*, Austin quotes as a synonym the *Jungermannia scitula* of Taylor; the type-specimen of this species, however, shows that it is abundantly distinct. Stephani also recognizes its validity and describes it as *Sphenolobus scitulus* (Tayl.) Steph.

7. SPHENOLOBUS HELLERIANUS (Nees) Steph. Bull. de l'Herb. Boissier II. 2: 166. 1902. *Jungermannia Helleriana* Nees; Lindenberg, Nova Acta Acad. Caes. Leop.-Carol. 14, suppl.: 64. 1829. *Diplophyllum Hellerianum* Dumort. Recueil d'Obs. sur les Jung. 16. 1835. *Jungermannia verruculosa* Lindb. Not. pro F. et Fl. Fenn. 13: 369. 1874. *Diplophyllia Helleriana* Trevis. Mem. R. Ist. Lomb. III. 4: 420. 1877. *J. verruculosa*, var. *Helleri* Lindb. Musc. Scand. 8. 1879. *Cephalozia Helleri* Lindb. Medd. Soc. F. et Fl. Fenn. 14: 65. 1887. *S. Hellerianus* is quoted in Gray's Manual from "N. Eng." but was omitted from the Preliminary List because the record was so indefinite. There is, however, in the herbarium of the New York Botanical Garden, a specimen from the White Mountains, New Hampshire, collected by Oakes, and on the basis of this, the species may be restored. The plant grows on rotten logs, and is usually accompanied by other minute hepatics. Although widely distributed in North America, it is apparently very rare. All of the specimens seen have been provided with gemmae but destitute of floral organs, yet this fact offers no difficulty in their determination because the gemmiparous branches are so striking; they consist of short upright shoots with closely appressed and more or less imbricated leaves, which give off the gemmae from their margins. These leaves are imperfectly developed and differ considerably from the

¹ Bull. Soc. Bot. de France, 49: 204-209. 1902.

typical leaves on prostrate shoots; they give the gemmiparous branches very much the appearance of those found in *Scapania glaucocephala* and *Odontoschisma denudatum*, both of which are larger species. *S. Hellerianus* may certainly be expected in other parts of New England.

8. CEPHALOZIA JACKII Limpr.; Spruce, On Cephalozia, 67. 1882. *Cephaloziella Jackii* Warnst. Kryptogamenfl. der Mark Brandenburg, 1: 230. 1902. "On earth at base of a pine tree." Amesbury, Massachusetts (*J. W. Huntington*). This interesting little species is very closely related to *C. divaricata* but is distinguished by its par-
oicous inflorescence. The species of *Cephalozia* belonging to the subgenus *Cephaloziella* are not clearly understood even in Europe, and this is especially true of *C. divaricata*. Apparently Spruce himself understood this species in too broad a sense and included in it a number of dioicous types which are probably specifically distinct. A few of these have already been separated by Schiffner and others, but the confusion regarding the group as a whole is not yet wholly cleared away. Several of these newly separated species also occur on this side of the Atlantic, but it seems wisest for American students to continue referring them to *C. divaricata* until European writers have reached more definite conclusions.

9. CEPHALOZIA SERRIFLORA Lindb. Medd. Soc. F. et Fl. Fenn. 3: 188. 1878. *Jungermannia reclusa* Tayl. Lond. Jour. Bot. 5: 278. 1846 (in part?). *C. reclusa* Dumort. Hep. Eur. 92. 1874 (in part?). *C. catenulata* Spruce, on Cephalozia, 33. 1882 (in part). *C. Virginiana* Spruce, l. c. 37 (?). Jericho, Vermont (*A. W. E.*); Westville, Connecticut (*A. W. E.*). The specimens from Mount Desert, Maine, collected by E. L. Rand and listed as *C. virginiana* are somewhat doubtful but probably also belong here.¹ In Spruce's description of *C. catenulata* the perichaetial bracts are said to be denticulate as a rule but in rare instances nearly or quite entire. According to more recent European writers Spruce's species includes two distinct specific types, the plants with entire bracts representing the true *J. catenulata* of Hübener and those with denticulate bracts belonging to *J. reclusa* of Taylor. Unfortunately the identity of Taylor's species cannot be satisfactorily established; the plants labeled *J. reclusa* in his herbarium include four or five distinct species in poor condition, and his original description makes no allusion to the bracts. It is

¹ Rand & Redfield, Flora of Mount Desert Island, Maine, 221. 1894.

perfectly evident that he had no definite idea as to the limits of his species, and this statement is fully corroborated by the writings of both Carrington and Spruce. On this account it seems best to give up the name *reclusa* altogether and to apply to this distinct species the later name *serriflora* of Lindberg, a course already pursued by Jack and others. *C. Virginiana* is scarcely distinct from *C. serriflora* and apparently represents a luxuriant form of the species. The range of *C. serriflora* extends from Canada to the Gulf States, the species becoming more abundant southward. In New England it seems to be rare but has probably been overlooked. From other species growing on rotten logs it may be distinguished by its widely spreading and deeply bifid leaves, the acute divisions being straight or slightly connivent; by its leaf-cells with uniformly thickened walls; by its dentate or denticulate perichaetial bracts, and by its thin-walled, three-angled perianth with ciliate mouth. It varies in color from green to brown, and does not become bleached out with age. The true *C. catenulata* is not yet definitely known from North America.

(To be continued.)

JUNCUS ARISTULATUS IN NEW ENGLAND.

EUGENE P. BICKNELL.

It appears from Mr. Fernald's carefully prepared list of New England *Juncaceae* published in RHODORA 6: 34-41, that *Juncus aristulatus* Michx. is not known as a New England plant. In regard to this Mr. Fernald writes me, "I searched in vain for it in such herbaria as were accessible when I was preparing my list, for it belongs to the flora which is so characteristic of Nantucket and Martha's Vineyard, and I was surprised not to find it creeping into our borders." It should be recorded therefore that this rush does occur within these borders and, moreover, not at all as a feeble straggler but as a definite feature in the flora, reaching a very full development and fruiting prolifically. On September 18, 1899, I found it on Nantucket where it was not uncommon about one general locality somewhat east and north of the middle of the island. Specimens there collected have been forwarded to the Gray Herbarium. It may be added that

the species occurs, but in less vigorous development, at Van Cortlandt, N. Y., not very many miles from the Connecticut State line.

No practised eye which has once rested on this plant in life will hesitate to accept it as entirely distinct from *Juncus marginatus* Rostk., of which it was long supposed to be only a variety, and there is no need of here rehearsing the characters that give it individuality. But Mr. Fernald, referring particularly to the Nantucket specimens, calls my attention to a character of the species in distinction from *Juncus marginatus* which seems to have been generally overlooked. Dr. Small in his Flora of the Southeastern United States has described the larger stamens of *J. aristulatus*. Mr. Fernald observes that these larger exerted stamens with their darkened anthers are persistent and conspicuous in fruit when the small included stamens of *J. marginatus* are usually quite shrivelled and obscure. Something of this same difference in size and persistence is also seen in the styles of the two plants. In the Nantucket specimens these characters are very noticeable, but they are probably not always obvious, since I find them much less evident in certain specimens collected on Long Island.

Some interesting and rather pronounced differences between the seeds of the two plants may here be noted. As seen *en masse*, sprinkled in hundreds in the sheets where the fully matured plants have lain, those of *J. marginatus* are of a dull cinnamon-brown color, those of *J. aristulatus* being of a rather bright brownish-orange in marked contrast. Those of *J. aristulatus* are the more transparent, and though variable are mostly of a very different shape — narrowly oblong rather than oval or short oblong, instead of straight often distinctly curved, sometimes oppositely so at either end, more tapering both ways and distinctly apiculate or short-tailed, sometimes, indeed, with one tailed end fully one quarter the length of the body of the seed itself; in *J. marginatus* the seeds are mostly somewhat blunt, indistinctly apiculate on one end and not more than short apiculate on the other; they are also shorter than those of *J. aristulatus*, sometimes not more than half as long. These differences have proved to be very constant in the specimens I have been able to compare.

WOODMERE, LONG ISLAND.

NOTES ON MARYLAND PLANTS.

HUBERT LYMAN CLARK.

DURING August, 1903, it was my good fortune to spend several weeks in botanizing on the Eastern Shore, Md. Most of the field work was done in Talbot County, about three miles south of Easton, where the country is much cut up by so-called "creeks" which contain brackish or salt water and are really small branches of Chesapeake Bay. There is very little really fresh water in the way of either ponds or streams, in that vicinity, nor are there many springs. The woods are largely of oak of several species but there is considerable pine still standing. Besides botanizing around Easton, I made two excursions to Ocean City, Md., and investigated the woodland lying between that city and Berlin. The flora along the railroad track in that region is very interesting and is quite characteristically that of pine barrens. Among the many interesting species collected here, those which were of most interest to me were *Polygala lutea*, *Diodia virginiana*, *Ludwigia hirtella*, *Pluchea bifrons*, *Alnus maritima*, *Sagittaria lancifolia*, *Xyris caroliniana*, *Woodwardia angustifolia* and *Lycopodium alopecuroides*.

Both in Talbot County and near Ocean City, plants were found, which seemed to me sufficiently different from the descriptions given in the botanies to raise a question as to the correctness of my identifications. They were therefore sent to the Gray Herbarium of Harvard University where Dr. J. M. Greenman kindly examined them, and I am under great obligations to him for helping me in my difficulty. Among these plants the following seem worthy of special note.

ASPIDIUM CRISTATUM CLINTONIANUM D. C. Eaton. Several plants of this handsome fern were found in a little glade, two or three miles southeast of Easton. The discovery extends the recorded range of this variety considerably to the south.

POTAMOGETON MYSTICUS Morong. This pond-weed was found growing in company with *P. pusillus*, *P. marinus*, *P. pennsylvanicus* and *Najas flexilis* in a shallow body of water, which was fresh at its inland end but opened into the ocean, near Ocean City, Md. As this species has not been collected previously south of Nantucket, its occurrence in Maryland seems quite remarkable.

TIPULARIA DISCOLOR Nutt. As Gray's Manual calls this orchid "very scarce" and Britton and Brown say it is "rare and local," I was greatly surprised to find it quite common in almost every piece of woodland I visited south and east of Easton. In fact it was decidedly the most common of the seven species of orchids found. Although some little time was spent in watching for insect visitors, none were seen.

DESMODIUM PAUCIFLORUM DC. This plant was found in woodland close beside the glade where the Clinton fern was collected, a locality apparently considerably east of its previously recorded range. The flowers were perfectly pure white, in striking contrast to other *Desmodiums*.

PLUCHEA PETIOLATA Cass. This species is not very rare in the woodlands south of Easton, a place much north of its previously recorded range. The first specimens were found beside the public highway, in woodland, and were at once distinguishable from other *Pluchas* by the longer petioles, higher stems and more convex inflorescence; the general appearance was that of depauperate specimens of *Eupatorium purpureum* L. Other specimens were afterwards found in similar situations, moist but not swampy ground in woodland and not near water.

In conclusion, I may add that specimens of these five species have been deposited in the Gray Herbarium.

OLIVET, MICHIGAN.

NOTES ON TWO CONNECTICUT GRASSES.

R. W. WOODWARD.

Poa serotina.—In the summer of 1902, I noticed, at New Haven, Connecticut, a peculiar grass growing for several hundred feet along the edge of a shaded woodland road which leads up out of a wet meadow. In 1903 the same grass was observed in about the same abundance beside this road, and also at several other stations, all of which were in more or less shaded situations. It proved to be a woodland form of *Poa serotina*, Ehrhart, occurring in dry places, and showing marked variation from the species. The culm is more

slender and the panicle less ample, with a varying proportion of the spikelets undeveloped and consisting of a pair of empty scales. The remaining spikelets contain, as a rule, a single, perfect flower with a pedicel of a second abortive flower. The glume of this perfect flower is somewhat webby at the base and slightly pubescent on the lower half of the marginal nerves and the midnerve, with the intermediate nerves obscure or wanting — well known characteristics of *Poa serotina*. But a further and essential character of normal *Poa serotina* is a spikelet with from two to four perfect flowers, while in this woodland form, at least in all the specimens collected by the writer, it is unusual and exceptional when a spikelet develops more than one perfect flower. Spikelets with two perfect flowers occur, however, occasionally. These match spikelets of normal *Poa serotina* in every particular, and connect this perplexing variety with the species. It should be added that the proportion of undeveloped to developed spikelets varies greatly, depending apparently upon the density of the shade. In open woodlands nearly all of the spikelets may be developed and consist of one perfect flower and a second rudimentary flower, as described above. Specimens were collected on July 16, July 21 and August 6, 1903. The ordinary form of the species was in full bloom about July 15. This woodland form is not mentioned in the current standard manuals.

Agrostis intermedia, Scribner. — This species is common in dry woodlands in this vicinity and sometimes makes a dense growth in the more open spaces and in clearings. At one of the New Haven reservoirs there is, bordering the water, a narrow strip of recently cleared land, where this grass has come in, to the exclusion of other species. I collected specimens here on August 14, 1903, and endorsed the sheet, "very abundant, enough for a good crop of hay." On revisiting the spot a few days later, I found that the same idea had occurred to the men employed about the reservoir. They had cut and cured and were just hauling away a small load of hay, weighing several hundred pounds, which was practically all *Agrostis intermedia*.

NEW HAVEN, CONNECTICUT.

PYROLA ASARIFOLIA, MICHX., var. *incarnata*, n. comb. — *P. rotundifolia*, var. *incarnata*, DC. Prodr. vii (1839) 773. *P. incarnata*,

Fisch. ex DC. l. c., as syn. *P. uliginosa*, Torr. & Gray in Torr. Fl. N. Y. i. (1843) 453, t. 69. *P. rotundifolia*, var. *uliginosa*, Gray, Man. Ed. 2 (1856) 259.—*P. rotundifolia*, with which *P. asarifolia* and *P. incarnata* (*P. uliginosa*) have been very generally united, has white flowers 1.5 to 2 cm. broad, and in America occurs in open dry or sandy woods from Prince Edward Island and Nova Scotia to South Dakota and Georgia. *P. asarifolia* and *P. incarnata*, on the other hand, have pink or crimson flowers 1 to 1.5 cm. broad, and occur in cold, wet or mossy woods or in sphagnum from the Gulf of St. Lawrence to Hudson Bay and Alaska, south to northern New England and New York, the Great Lakes and the Rocky Mountains; also in northeastern Asia. Although in dried specimens somewhat resembling *P. rotundifolia*, the plants in the field occupy an area so essentially different and so constantly have pink or purplish smaller flowers that they must be regarded as specifically distinct from the larger white-flowered plant of dry woods of the Atlantic slope. In their extreme forms *P. asarifolia* and *P. incarnata* are separated only by leaf-outline, the former having oblate or round-reniform cordate leaves, the latter obovate or suborbicular leaves rounded to the base. A large series of herbarium specimens and many observations of the plants in northeastern stations show no appreciable difference in the flowers; and too often colonies with leaves connecting the two extremes abound in swamps of northern Maine and Quebec. On this account the plants seem to the writer best treated as phases of one widely distributed species of the northern mossy woods.—M. L. FERNALD, Gray Herbarium.

TRIOSTEUM PERFOLIATUM IN MASSACHUSETTS.—At a recent exhibition of native plants at Horticultural Hall, Boston, much interest was taken in specimens of *Triosteum perfoliatum*, L., from East Weymouth, Mass. This species has not before been reported from Massachusetts, the only station heretofore known for it in New England being in Connecticut. For a long time *Triosteum aurantiacum*, Bicknell, has been wrongly called *T. perfoliatum*, but both species were to be seen at this exhibition and the following differences were most noticeable. The opposite leaves of *T. perfoliatum* formed a wide margin where the two united around the stem of the plant, the margin thus formed often measuring half an inch in width on each side of the stem, in this respect much resembling *Eupatorium perfoli-*

atum, L. In *Triosteum aurantiacum*, however, the leaves were abruptly sessile. The leaves of *T. perfoliatum* were so densely pubescent as to be nearly viscid, while those of *T. aurantiacum* were slightly soft-pubescent.

Although both species were in bloom at the same time, yet *T. perfoliatum* was not so far advanced as *T. aurantiacum*, thus indicating a later time of blossoming for the former species.

Triosteum perfoliatum was found growing at the edge of an oak wood near a salt-marsh. Another clump, somewhat farther inland, grew along a stone wall in an old field.

The specimens brought for exhibition were first identified by Mr. W. P. Rich, and later verified by Mr. Alfred Rehder of the Arnold Arboretum.—ALICE G. CLARK, East Weymouth, Massachusetts.

THE CONNECTICUT FLORA AT THE ST. LOUIS EXPOSITION. — The Connecticut Commission, Department of Horticulture, Division of Herbariums, of the Louisiana Purchase Exposition, is exhibiting at St. Louis in the Horticultural Building an herbarium representing the flora of the State. It contains two thousand sheets so arranged on swinging panels that every plant is shown to good advantage. The work has been accomplished through members of the Connecticut Botanical Society and other well known collectors; the following having contributed: Dr. C. B. Graves and Mrs. Elisha E. Rogers representing New London County; Mr. E. B. Harger, Mr. R. W. Woodward and Mr. G. H. Bartlett representing New Haven County; Dr. E. H. Eames and Mr. Amedee Hans representing Fairfield County; Miss Mary C. Seymour representing Litchfield County; Mr. C. H. Bissell, Mr. C. A. Weatherby, Mr. J. N. Bishop, Mr. Irving Holcomb, Miss S. Maria Williams and Mr. A. W. Driggs representing Hartford County. A large part of the material was collected the past year, the work having been started at the opening of the season. This was desirable, as it represents an herbarium of the flora as we know it now. After its exhibition in St. Louis this herbarium is to be returned to Hartford, where it is hoped that it may be made accessible to the public, and prove a help to the student and a source of inspiration and stimulus to all interested in botanical research.—A. W. DRIGGS, Hartford, Connecticut.

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